

Plumbing Requirements

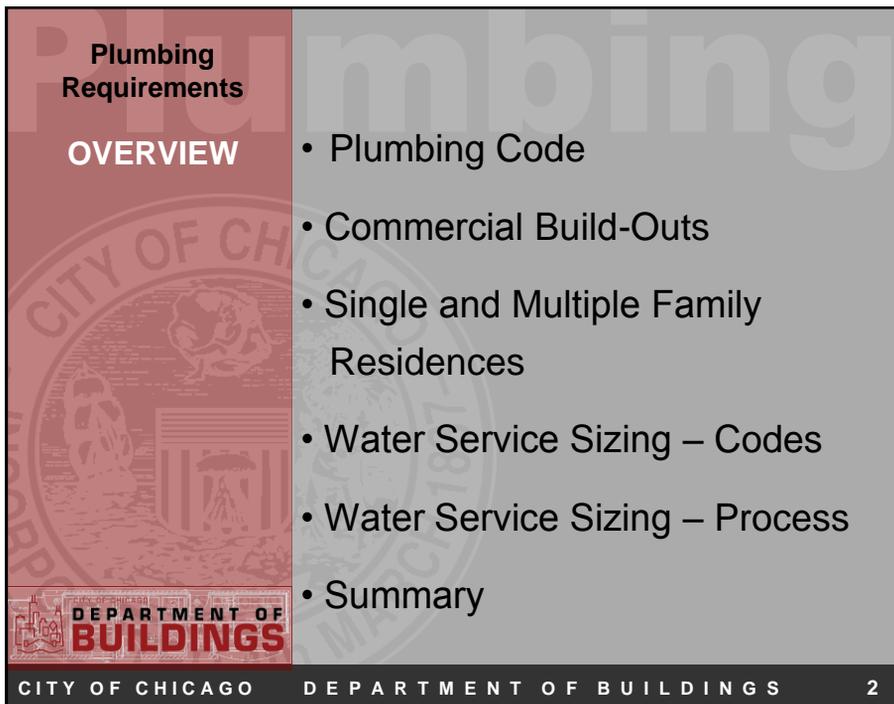
Self-Certification Training Class

Plumbing Requirements

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Plumbing Inspector

DEPARTMENT OF BUILDINGS

CITY OF CHICAGO DEPARTMENT OF BUILDINGS 1



Plumbing Requirements

OVERVIEW

- Plumbing Code
- Commercial Build-Outs
- Single and Multiple Family Residences
- Water Service Sizing – Codes
- Water Service Sizing – Process
- Summary

DEPARTMENT OF BUILDINGS

CITY OF CHICAGO DEPARTMENT OF BUILDINGS 2

Plumbing Requirements

COMMERCIAL BUILD-OUTS

Drinking Fountains/Service Sinks

- See Table 18-29-403.1
- *Commercial office build-out/ DF not required WHEN within these tenant spaces a kitchen or kitchenette with a kitchen sink is provided. Must be ADA accessible and disposable cups must be permanently provided.*

DEPARTMENT OF BUILDINGS

CITY OF CHICAGO DEPARTMENT OF BUILDINGS 3

Plumbing Requirements

COMMERCIAL BUILD-OUTS

Drinking Fountains/Service Sinks

- 18-29-403.7 Drinking fountains
- 18-29-410.1 Approval
- 18-29-410.2 Prohibited locations
- 18-29-403.1 Minimum number of fixtures

DEPARTMENT OF BUILDINGS

CITY OF CHICAGO DEPARTMENT OF BUILDINGS 4

Plumbing Requirements

COMMERCIAL BUILD-OUTS

Grease Interceptor

- 18-29-418.2.1 Facilities with no range oven

DEPARTMENT OF BUILDINGS

CITY OF CHICAGO DEPARTMENT OF BUILDINGS 5

Plumbing Requirements

COMMERCIAL BUILD-OUTS

Hot Water Heater

- 18-29-504.8 Required pan
- 18-29-504.7.1 Discharge
- 18-29-504.7.2 Location
- 18-29-504.8.2 Pan drain termination

DEPARTMENT OF BUILDINGS

CITY OF CHICAGO DEPARTMENT OF BUILDINGS 6

Plumbing Requirements

COMMERCIAL BUILD-OUTS

DEPARTMENT OF BUILDINGS

CITY OF CHICAGO

DEPARTMENT OF BUILDINGS

7

Hot Water Heater Article 2 Definitions

- **Receptor:** A receptacle which receives the discharge from indirect waste and is directly connected to this inlet of a properly vented trap. It shall be of cast-iron, brass, lead or aluminum and shall be of such shape and capacity as to prevent splashing or flooding. The receptor outlet and trap shall not be less than 1-1/2”.

Plumbing Requirements

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DEPARTMENT OF BUILDINGS

CITY OF CHICAGO

DEPARTMENT OF BUILDINGS

8

Hot Water Heater Article 2 Definitions

- **Floor Drain:** A receptacle fitted with a strainer or grate, a trap or seal, and connected to the plumbing or drainage system.

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COMMERCIAL BUILD-OUTS

Hot Water Heater

- Therefore, a mop basin is NOT an approved indirect waste receptor or a floor drain.

DEPARTMENT OF BUILDINGS

CITY OF CHICAGO DEPARTMENT OF BUILDINGS 9

Plumbing Requirements

COMMERCIAL BUILD-OUTS

Condensate to Floor Drain or O.S.D.

- 18-29-802.1 Where required
- 18-29-802.1.4 Non-potable clear-water waste
- 18-29-607.1.1 Water temperature - automatic safety mixing device
- 18-29-501.8.1 Instantaneous water heaters
- 18-29-802.1.7 Sinks

DEPARTMENT OF BUILDINGS

CITY OF CHICAGO DEPARTMENT OF BUILDINGS 10

Plumbing Requirements

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DEPARTMENT OF BUILDINGS

CITY OF CHICAGO

Storm Drainage

- 18-29-1101.2.1 Roof drainage and downspouts, exceptions 1 and 2
- 18-29-1104.2 Combining storm with sanitary drainage
- 18-29-412.4.2 Sanitary waste drainage (see Area Drain under Article 2 definitions)
- 18-29-702.1 Above-ground drainage and vent pipe

CITY OF CHICAGO DEPARTMENT OF BUILDINGS 11

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SINGLE & MULTI-FAMILY RESIDENTIAL

DEPARTMENT OF BUILDINGS

CITY OF CHICAGO

Suds Pressure Zone

- 18-29-711.3.2 Suds pressure zone
- 18-29-712.3.2 Sump pit: material

CITY OF CHICAGO DEPARTMENT OF BUILDINGS 12

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WATER SERVICE SIZING

Codes

- 18-29-417.1 Showers approval
- 18-29-417.4.4 Water temperature safety
- 18-29-424.4 Shower valves
- 18-29-607.1.2 Shower compartments and shower/bath combinations

DEPARTMENT OF BUILDINGS

CITY OF CHICAGO DEPARTMENT OF BUILDINGS 13

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SEWER SEPARATION/ REUSE OF EXISTING

Codes

- 18-29-603.2 & 18-29603.2.1
- TITLE 35(State code)
- 18-29-301.3- connections to drainage system /reuse of existing building drains and sewers.
- If there is a conflict with the main sewer,WM adjustment and or sewer replacement might be applicable.

DEPARTMENT OF BUILDINGS

CITY OF CHICAGO DEPARTMENT OF BUILDINGS 14

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WATER SERVICE SIZING/ REUSE OF EXISTING

Procedures for Calculating the Minimum Sizing of the Water Supply System (see Appendix A)

- Reuse of any fire only service is not allowed.
- Reuse of ANY water service needs to be approved by Chief Plumbing Inspector

DEPARTMENT OF BUILDINGS

CITY OF CHICAGO DEPARTMENT OF BUILDINGS 15

Plumbing Requirements

TAP REQUIREMENTS FOR DEVELOPER SERVICES/SELF CERTIFICATION

- Plans must be submitted to plan desk
- Fire letter must be received
- Flow test approved
- 18-29-603.3.4 metering requirements
- Work order issued pending BES

DEPARTMENT OF BUILDINGS

CITY OF CHICAGO DEPARTMENT OF BUILDINGS 16

Plumbing Requirements

WATER SERVICE SIZING

DEPARTMENT OF BUILDINGS

CITY OF CHICAGO

DEPARTMENT OF BUILDINGS

17

Codes 604 Design of Building Water Distribution Systems

- 18-29-604.3 Water distribution system design criteria
- 18-29-604.3 *Table: Water Distribution Systems Design Criteria Required Capacitors at Fixture Supply Pipe Outlets*
- 18-29-604.6 Variable street pressures set by the Department of Water (30 psi)

Plumbing Requirements

WATER SERVICE SIZING

DEPARTMENT OF BUILDINGS

CITY OF CHICAGO

DEPARTMENT OF BUILDINGS

18

Sample field card with information & calculations for new 3-story SFR

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WATER SERVICE SIZING

Step 1

- Compute the total number of Water Supply Fixture Units from *Table 18-29-604.10.1*

	# of				
	Fixtures		WSFU	=	Total
Water closet	5	X	3	=	15
Lavatory	7	X	1	=	7
Bathtub/shower	5	X	2	=	10
Kitchen sink	1	X	2	=	2
Dishwasher	1	X	2	=	2
Washing machine	2	X	2	=	4
Bidet	1	X	2	=	2
Total # of Fixtures	22				Total WSFU 42

DEPARTMENT OF BUILDINGS

CITY OF CHICAGO DEPARTMENT OF BUILDINGS 19

Plumbing Requirements

WATER SERVICE SIZING

Step 2

- Using *Table 18-29-604.10.2*, convert the total water demand from fixture units to gallons per minute (predominantly for flush tanks).
- Total # WSFU = 42 = 24.3 gpm

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CITY OF CHICAGO DEPARTMENT OF BUILDINGS 20

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WATER SERVICE SIZING

Step 3

- Determine the elevation of the highest fixture. This result is the loss in static pressure in pounds per square inch (psi). Measure from the top plate of the floor.

Water service to grade	5'-0"
Grade to first floor	5'-5 3/4"
First floor to second floor	12'-0"
Second floor to third floor	11'-5"
Shower	5'-0"
Total	38'-10 3/4"

CITY OF CHICAGO DEPARTMENT OF BUILDINGS 21

Plumbing Requirements

WATER SERVICE SIZING

Step 3

- Multiply this elevation in feet by 0.434. The result is the loss in static pressure in pounds per square inch (psi).
- Highest fixture, which is the shower, temperature-controlled, is at $38' 10\text{-}3/4" \times 0.434 = 16 \text{ psi}$

CITY OF CHICAGO DEPARTMENT OF BUILDINGS 22

Plumbing Requirements

WATER SERVICE SIZING Step 4

- Refers to water supply servicing inside buildings. This step is not needed for water sizing.

DEPARTMENT OF BUILDINGS

CITY OF CHICAGO DEPARTMENT OF BUILDINGS 23

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WATER SERVICE SIZING Step 5

- Compute the pressure loss through the meter. For pressure losses, consult the manufacturer's data.
- Note: City of Chicago Department of Water states a 3 psi loss.

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WATER SERVICE SIZING

Step 6

- Compute the available pressure to overcome friction in the piping system. First compute all losses. Determine the working pressure at the highest fixture per:
- *Table 18-29-604.3 Water Distribution System Design Criteria Required Capacities at Fixture Supply Pipe Outlets*

DEPARTMENT OF BUILDINGS

CITY OF CHICAGO DEPARTMENT OF BUILDINGS 25

Plumbing Requirements

WATER SERVICE SIZING

Step 6

Note: For shower, temperature controlled use the fixed figure of 20 psi.

Height loss	16 psi
Working pressure at highest fixture	20 psi
Meter loss	<u>3 psi</u>
Total loss	39 psi

DEPARTMENT OF BUILDINGS

CITY OF CHICAGO DEPARTMENT OF BUILDINGS 26

Plumbing Requirements

WATER SERVICE SIZING

Step 7

Compute the developed length of the basic circuit of piping from the main in the street, the house pump, the outlet side of the pressure value or other source of supply pressure to the highest and farthest outlet. Per the City of Chicago Department of Water, the distance from the water main to the property line is always 25'.

Highest fixture	38'-10 3/4"
Length of building	70'-0"
Setback to water main	<u>25'-0"</u>
Developed length	133'-10 3/4"

DEPARTMENT OF BUILDINGS

CITY OF CHICAGO DEPARTMENT OF BUILDINGS 27

Plumbing Requirements

WATER SERVICE SIZING

Step 8

- For equivalent length run (or ELR), see *Table 18-29-604.10.3 Allowance in Equivalent Length of Pipe for Friction loss in Valves and Threaded Fittings.*
- Note: City of Chicago, Department of Water states the ELR in copper fittings = 1.3 and in galvanized fittings = 1.5. Department of Water uses galvanized fittings.
- Multiply developed length by ELR for galvanized fittings: 133'
10-3/4" x 1.5 = 200'

DEPARTMENT OF BUILDINGS

CITY OF CHICAGO DEPARTMENT OF BUILDINGS 28

**Plumbing
Requirements**

**WATER SERVICE
SIZING**



Step 9

- City of Chicago Department of Water states that water working pressure in city water mains is 30 psi. Take the total pressure loss in the building (Step 6) and subtract it from the working pressure in the water main (30 psi).

$30 \text{ psi} - 39 \text{ psi} = -9 \text{ psi}$

- Two ways to proceed: one for positive results and one for negative results.

CITY OF CHICAGO
DEPARTMENT OF BUILDINGS
29

**Plumbing
Requirements**

**WATER SERVICE
SIZING**



Step 9: Positive Results

- Take the developed length by ELR (Step 8). Divide the outcome of Step 9 by this number and multiply by 100 (for 100' of developed length). The resulting positive working pressure does not require a water pressure booster for your system.
- (Working pressure) - (Developed length by ELR x 100)

$9/200 = .045 \times 100 = 4.5$

CITY OF CHICAGO
DEPARTMENT OF BUILDINGS
30

Plumbing Requirements

WATER SERVICE SIZING

Step 9: Negative Results

- In this example, the result is a negative working pressure (-9), which indicates that you require a water pressure booster system per: 18-29-604.7 Inadequate water pressure

DEPARTMENT OF BUILDINGS

CITY OF CHICAGO DEPARTMENT OF BUILDINGS 31

Plumbing Requirements

WATER SERVICE SIZING

Step 9: Negative Results

- Take the outcome of Step 2 (water demand from fixture units to gallons total per minute) and the outcome of Step 9 (working pressure). Per 18-29-604.10.1.2 Size of Piping When a Water Service Requires a Pump, the velocity of flow and the service shall not exceed 5 feet per second velocity

DEPARTMENT OF BUILDINGS

CITY OF CHICAGO DEPARTMENT OF BUILDINGS 32

Plumbing Requirements

WATER SERVICE SIZING

Step 9: Negative Results

- Go to *Chart 11-8-540B Flow Chart for Smooth Pipe*. Take 24.3 gpm on the left or right side of the chart. Go to velocity of 5 feet per second, which is the longest line on the chart running diagonally across. Put into cross hairs velocity of 5 feet per second and 24.3 gpm and your service size will be one of the numbers on the left hand side
- In this example, the result is 1-1/2" with a 24.3 gpm booster system

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RECENT CLARIFICATION MEMOS

- Pilot Program: Use of Material Authorized by the Illinois Plumbing Code in Smaller Buildings
- Use of Single-User Unisex Restrooms to Provide Separate Facilities.(Multi-user restrooms are not permitted in Illinois.)
- Number of Public Restrooms for new Food Service establishments

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Plumbing Requirements

New Chicago Building Rehab Code Section 1009

- 1009.1 Increased Demand (over 20%)
- 1009.2 Food -handling occupancies
- 1009.3 Interceptor required
- 1009.4 Chemical wastes
- 1009.5 Group I-2

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CITY OF CHICAGO DEPARTMENT OF BUILDINGS 35

Plumbing Requirements

2020 State of Illinois Requirements

- Baby changing tables will be designated to ALL bathrooms. Not just Mens or Womens etc.
- IF (2) single use bathrooms are applicable they must be designated as Unisex.

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Plumbing Requirements

SUMMARY

- Make sure you use the new codes and requirements
- If a creative use of space is needed to achieve compliance, schedule a meeting or go through SPR. (i.e food-handling establishments.
- Contact 312-744-7060 with any questions

